

INSIDE

TERRA TRAC crawler track system

Background information, product tests and user reports.



INSIDE TERRA TRAC CRAWLER TRACK SYSTEM.

Contents.



The soil.

- 4 Our soil – a precious resource.
- 5 The soil is our workplace.



The expertise.

- 6 30 years of experience.
- 7 Systematic development.



The technology.

- 8 The driving force.
- 9 The advantages.



The line-up.

- 10 TERRA TRAC on LEXION.
- 14 TERRA TRAC on JAGUAR.
- 18 TERRA TRAC on AXION.
- 20 Already convinced.
- 22 Our partners.

On sure ground. Built on experience.

Ladies and Gentlemen,

Healthy and fertile soil is the basis of a good harvest. No agricultural or cultivation measures will succeed if the soil is not in optimal condition. The reality is that it is necessary to meet the narrow time windows for tillage, drilling and harvesting perfectly – and to do so with the highest possible level of machine performance.

The CLAAS research and development teams have been meeting these challenges for over 30 years. Every day, our engineers are faced with the task of reconciling soil protection, high performance and statutory requirements. Although the range of demands made on our machines is extremely diverse, we always place special emphasis on maintaining soil health.

Driving comfort combined with high on-road speed, smooth front attachment guidance and excellent directional stability: these are the characteristics that have convinced farmers and contractors around the world for over 20 years. Today, CLAAS TERRA TRAC crawler track units stand for the best possible combination of traction and efficiency, low soil pressure and protection of the grass cover.

Drawing on the experience acquired in more than two decades of hard, real-world use with CLAAS LEXION combine harvesters, we are now taking the next step. At Agritechnica in November 2017, under the heading "It's All About The Soil", we shall be presenting the enhanced TERRA TRAC crawler track units on our JAGUAR forage harvester and our AXION 900 large tractor.



I have been accompanying the development of this technology for years and I am convinced of its practical benefits for agriculture. I would like to invite you to use this brochure to form your own opinion about the development of our TERRA TRAC concept.

Kind regards,
Helmut Claas
Dipl.-Ing. Dr. h. c.

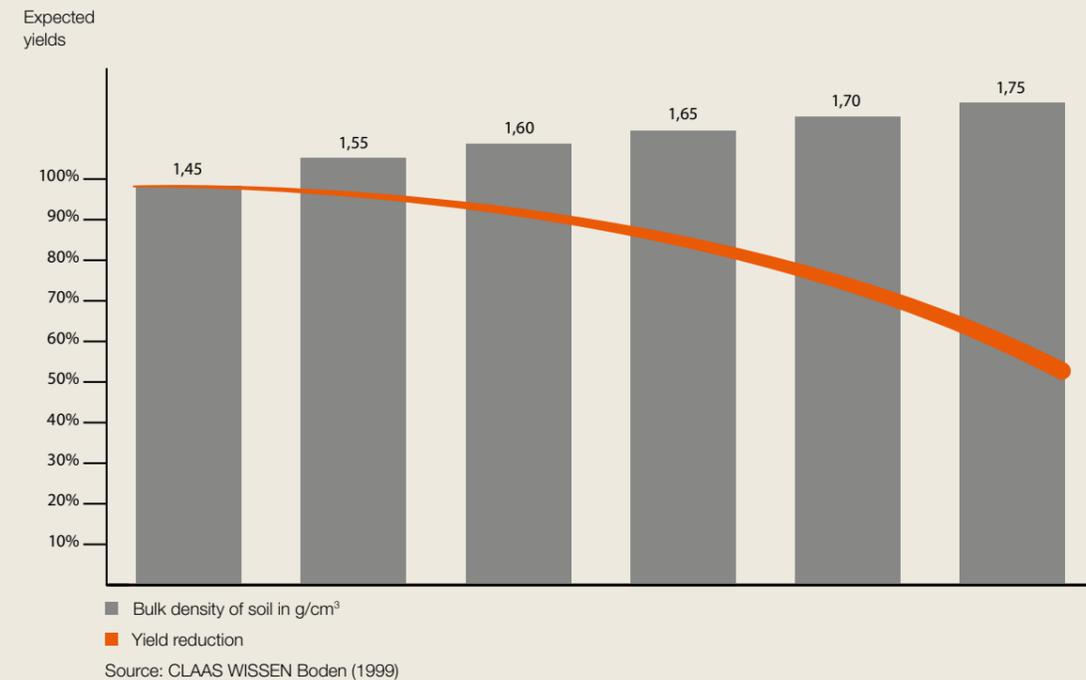
Our soil – a precious resource.

The soil is the most important basis for production in the agricultural sector. As it is impossible to create more of it, the increases in yield necessary for the growing world population have to be produced using the existing land. The greatest challenge in this respect is that of reconciling efficiency and sustainability. Farms are increasing in size and the time windows for cultivation and harvesting are becoming ever shorter. At the same time, machines are getting bigger, more powerful and, therefore, also heavier. Soil compaction is the result.

Expected decline in yield when the optimal bulk density of a loess soil is exceeded

What happens during soil compaction?

Pressure on the soil particles causes the pore spaces which are filled with air and water to be compressed. This not only leads to oxygen deficiency and the risk of waterlogging, but also impedes root growth. Furthermore, permeability for important substances and organisms is restricted and nutrient cycling is reduced.



The soil is our workplace.

Soil compaction caused by tractors or harvesting machines reduces the pore spaces in the soil. Oxygen deficiency and the risk of waterlogging as well as reduced soil micro-organisms are the result. These effects are manifested in subsequent crops in the form of delayed development, lower yield and inferior root growth. The harm done in just one harvest lasts for years. Of course, the damage is not irreparable. Deep tillage, catch crops or liming will restore arable land to its original level of productivity in the long term. But all these measures cost money. Would it not be easier to avoid the damage in the first place? At CLAAS, we make a point of addressing the need to minimise adverse effects on the soil right from the start of our machine development process. We have set ourselves the goal of preserving and protecting the most precious resource of all farmers. Because for us, like them: the soil is our workplace.



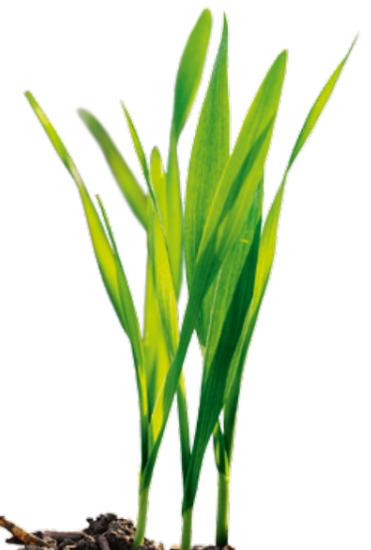
Robert Salmon, farmer from Norfolk, England

An integrated approach to soil management.

"I take an integrated approach to soil management. On its own, a combine harvester with crawler tracks isn't going to solve problems which have

deeper causes. It is up to the rest of the system to ensure that the soil structure is improved; a combine harvester is just the last link in the chain.

If you take care of the soil and avoid harmful compaction, you don't need to spend time and money undoing the damage."



30 years of experience.

Systematic development.

It was 30 years ago that CLAAS presented the first combine harvester with full rubber tracks. With its superior on-road performance and ability to operate at higher speeds, this new technology overcame the disadvantages of the steel tracks which had been used until then. But this was just the first step in a whole series of developments and continuous optimisation measures. In 1994, CLAAS developed the TERRA TRAC half-track. This new system impressed with its narrow transport widths and very

smooth running characteristics. It was also possible to reduce the problem of the tracks "scrubbing" at the headland. 1997 saw the market launch of the new LEXION with TERRA TRAC. This means that CLAAS has over 30 years of experience in rubber crawler track technology and now 20 years of experience in series production of the TERRA TRAC drive systems.

Agriculture is changing. In order to meet the growing demands of farmers and contractors with regard to area output, flexibility and reduced soil pressure, CLAAS is pursuing the systematic development of TERRA TRAC technology. Some 25,000 units have been produced to date and are in use in an extremely wide range of fields around the world. TERRA TRAC on

combine harvesters has proved itself in practical use in the most challenging conditions. Today, about one third of all LEXION combines and half of all LEXION HYBRID machines are equipped with TERRA TRAC.

▶ You can find further information at: terratrak.claas.com

1994



CLAAS started TERRA TRAC trials with a MEGA combine harvester. The land wheels had pneumatic tyres.

1997



The first TERRA TRAC crawler track series on a LEXION 450 was still attached rigidly to the axle. The land wheels were made of steel with bolted-on rubber elements to withstand the high frictional loads.

1997



For the US market, the combine harvesters were equipped with vulcanised land wheels as well as improved tracks which brought a further increase in their durability.

2004



The track units were now suspended on the axle by rubber blocks. This led to significantly reduced impact loads on the machine and a high level of driving comfort.

2006



The TERRA TRAC crawler track units now had a significantly reinforced structure thanks to a one-piece cast frame in order to meet the demands of the increased weight of the machines.

2011

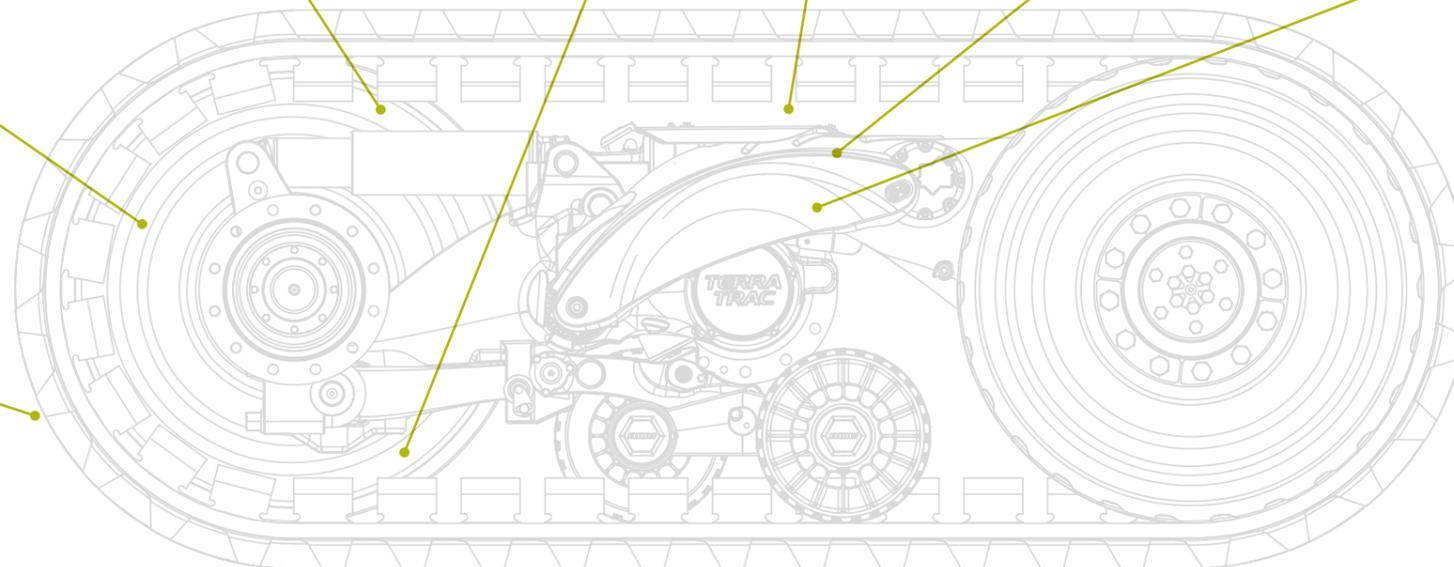


The new hydropneumatic suspension provided a high level of driving comfort in the field and on the road. This crawler track system is still fitted today.

1987



The first series-production combine harvester on full rubber tracks had its public launch at the Farm Progress Show in the US.



As the next logical step, the JAGUAR and the AXION are now equipped with the TERRA TRAC crawler track units which are specially optimised to meet customers' requirements.

The driving force.

The TERRA TRAC drive concept with its patented geometry combines reliable, durable components with sophisticated technology.

- Friction-locked drive: instead of an interrupted transmission of the drive force being provided by separate teeth, a continuous frictional drive connection is provided across the entire track.
- Large land wheels: the large land wheels prevent rapid sinking into the ground and enable an easier exit from the path formed by the machine in extreme conditions. Furthermore, their large diameter makes for a greater contact area with the track and enables effective power transmission.

- Automatic track tensioning: the strong track is tensioned by an additional hydraulic ram which prevents slippage. The tension is monitored electronically at all times. If the track tension pressure drops, the machine operator is warned via CEBIS.
- Hydropneumatic suspension: the smart suspension system provides a high level of driving comfort while keeping the loads on the machine down. Land wheels and support rollers are suspended separately. This allows ground speeds of up to 40 km/h and noticeably enhanced cornering stability.



The advantages.

The TERRA TRAC drive concept has convinced farmers and contractors around the world thanks to the following characteristics:

- Large contact area combined with a transport width that complies with road traffic licensing regulations
- Avoidance of soil compaction and preservation of the soil structure
- Less drive resistance, less slippage, lower fuel consumption and greater stability on slopes through optimised traction
- Higher seasonal performance through longer working times, even under difficult conditions
- Shallower ruts which can be eliminated easily during subsequent tillage
- Comfortable workplace in the field and on the road, even at speeds as high as 40 km/h thanks to fully suspended crawler track units

These advantages have consequences for the efficiency of farms/contractors and offer vast potential for cost savings. Maintenance of a good soil structure is the basic requirement for good yields. A good soil aggregate state can also keep the requirement for fertilizer to a minimum, as a healthy soil can make better use of the available nutrients than a compacted one.

Furthermore, use of the TERRA TRAC crawler track system can lead to fuel savings. Subsequent tillage can be performed with a lower tractive power requirement, as the soil compaction is more superficial than that which results when using other drive systems in the same weight classes. The good traction performance of the crawler tracks increases pulling power and thus also efficiency with the same fuel consumption.

The integrated approach.

The advantages of the TERRA TRAC concept are obvious and have proved themselves on combine harvesters for over 20 years. In order to make full use of the potential of the system, it is important to take an integrated approach to soil protection. This means treating the soil gently throughout every process in the chain. Taking this reasoning to its logical conclusion, CLAAS is now extending the application of this concept to the tractor and forage harvester so that farmers and contractors can treat the basis of their livelihood, the soil, sustainably from drilling to harvest.

TERRA TRAC on LEXION.

The TERRA TRAC crawler track system has proved itself on combine harvesters in more than 20 years of use in the field and is undergoing constant development to meet the exacting requirements of our customers. Today, about one third of all LEXION combines and half of LEXION HYBRID machines are equipped with TERRA TRAC.

Above all, our customers appreciate:

- Soil protection through 66% less pressure on the soil than that caused by wheeled machines (Cranfield University, 2006)
- Fast transfers between fields at up to 40 km/h with a transport width that complies with road traffic licensing regulations
- High level of driving comfort through the patented geometry and the intelligent suspension concept of the crawler tracks
- Higher seasonal performance through longer working times and greater traction with minimal slippage
- Smooth front attachment guidance and excellent directional stability through smooth handling
- High stability on side slopes through large contact area
- Potential for cost savings through protection of soil structure and reduced power required for subsequent tillage



Good driving comfort, high ground speed and compact transport width make transfers easier and faster.



With wide front attachments in particular, the TERRA TRAC crawler tracks make a major contribution to smooth and steady cutterbar guidance.



New track: the newly developed track with a modified rib layout is able to withstand the heavy loads encountered during on-road operation for longer.



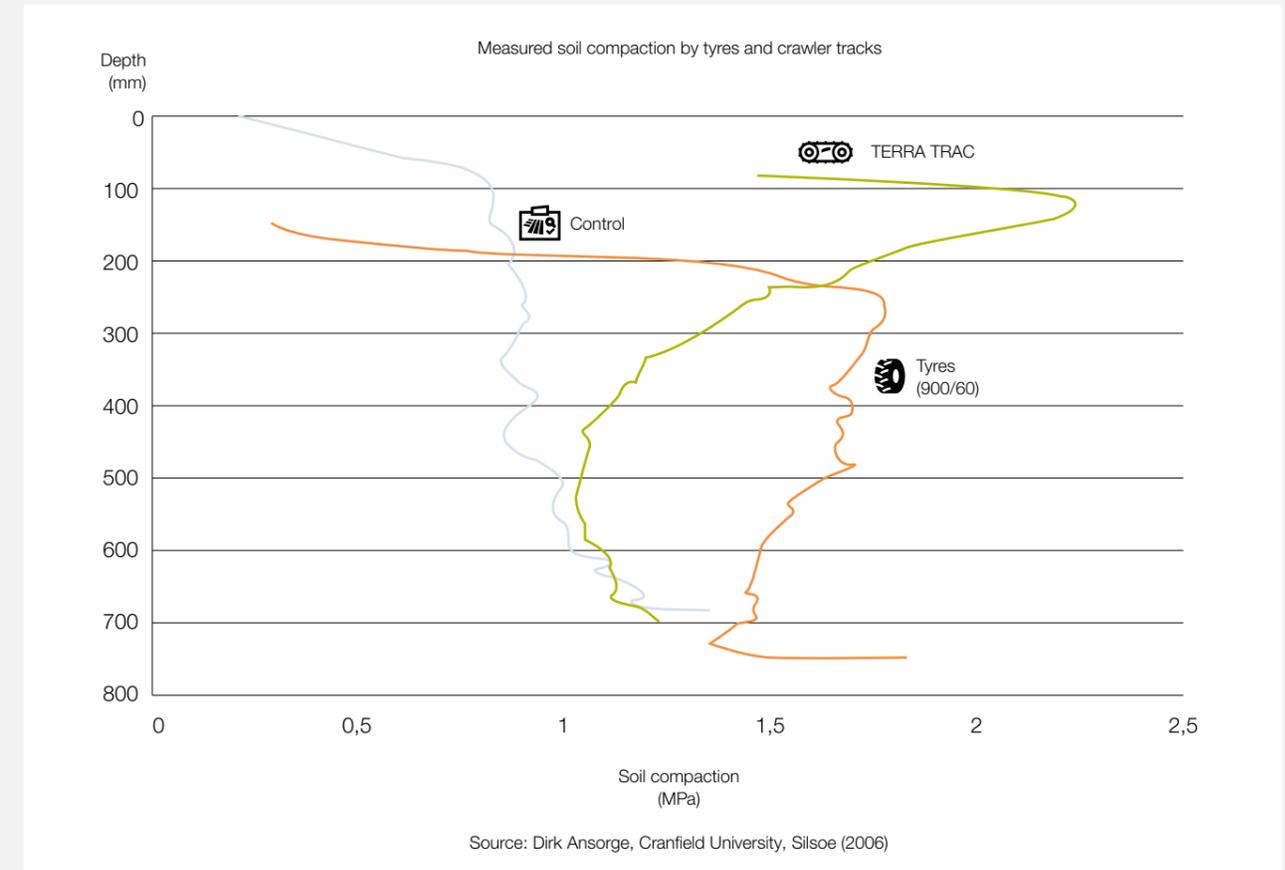
For the four different LEXION models a total of four different TERRA TRAC tracks are available in three widths: 635 mm, 735 mm as well as 890 mm for grain and 890 mm for rice.

LEXION TERRA TRAC put to the test.

It is no accident that TERRA TRAC crawler tracks are the world leaders in the agricultural sector. This drive concept has proved itself a thousand times over in practical use. Its advantages were proved scientifically in a study conducted by Cranfield University at Silsoe in the UK in 2006. This study, which involved using a penetrometer to determine the degree of soil compaction, revealed clear differences between tyres and tracked drives.

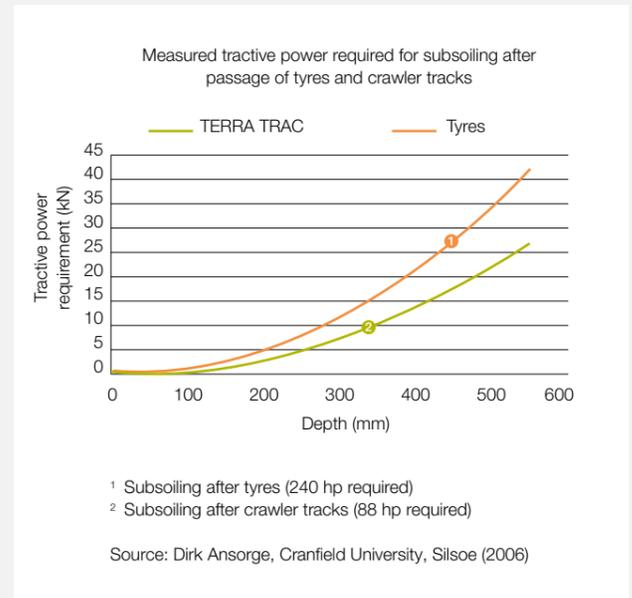
- Compared with oversize 800/65 R 32 tyres, the TERRA TRAC crawler track system reduces the soil pressure exerted by the combine harvester by about 66% and maintains it at a soil-friendly 0.8 bar.
- Despite its greater weight, the TERRA TRAC system causes much less soil deformation. The study shows that, at a depth of between 10 and 60 cm, soil deformation was on average 65% less than that observed with 900/60 tyres.
- Crawler tracks initially exhibit greater compaction down to a depth of 12 cm – below which the compaction decreases rapidly. At a depth of 40 cm there is no longer any statistically significant difference in comparison with uncompacted soil. (With tyres, the compaction increases down to 20 cm and remains almost constant down to 70 cm).
- The identifiable soil compaction caused by crawler tracks is kept close to the surface so that the compaction can be eliminated with conventional tillage measures.
- Crawler tracks leave behind them a "roadway", on which the rear tyres run, thereby avoiding additional compaction.
- The drastic reduction in the power required to perform subsequent tillage results in savings on the cost of fuel and labour.

The large contact area of the TERRA TRAC crawler track units results in less soil pressure and preserves the soil structure.



Advantages for subsequent tillage:

The low soil compaction means that fuel and working time can be saved during subsequent tillage. The tractive power required for subsoiling to a depth of 45 cm following a pass by crawler tracks is 36% less than that needed after a combine harvester with tyres has been used. The shallower compaction due to the tracks allows the working depth to be reduced by a whole 10 cm and therefore allows for a further reduction in the tractive power requirement from 240 hp to 88 hp. This represents a 63% reduction in the power required.



TERRA TRAC on JAGUAR.

Building on the well-recognised advantages of the TERRA TRAC crawler tracks with regard to soil protection and traction, CLAAS is the first forage harvester manufacturer to launch an optimal factory-integrated solution for the protection of soil and grassland against driving damage: the newly developed JAGUAR TERRA TRAC with headland protection. A notable innovation of this machine is the headland protection feature which reduces the track contact area at the headland, thereby protecting the grass cover. The JAGUAR TERRA TRAC is currently undergoing extensive field trials. When launched, it will make it possible for the first time to use the advantages of a crawler track system on a forage harvester on all surfaces throughout the whole year:

- Year-round operation without modification allows a high degree of machine utilisation
- Headland protection through automatic reduction of the track contact area when cornering or turning (less scrubbing)
- Fast transfers within a 3 m transport width (635 mm track) at up to 40 km/h
- Operating reliability under difficult conditions with high traction and low rut formation
- Long service life of new type of track with large number of ribs



Low rut formation improves accessibility for all the other vehicles in the crop handling chain



Headland protection: track contact area is shortened automatically by lifting the land wheels when cornering



Good accessibility: possible to remove corncracker from the side above the crawler track



With the 635 mm wide track, the JAGUAR has an external width of 2.99 m

JAGUAR TERRA TRAC – the first test.

Studies conducted by Kiel University of Applied Sciences confirm the positive effects of the measures to protect the soil and, in particular, the headland. During straight-ahead running, the JAGUAR equipped with the TERRA TRAC crawler track system exerted a load on the soil that was significantly lower than that of a wheeled machine with 800/70 R 38 front tyres and 620/70 R 30 tyres at the rear.

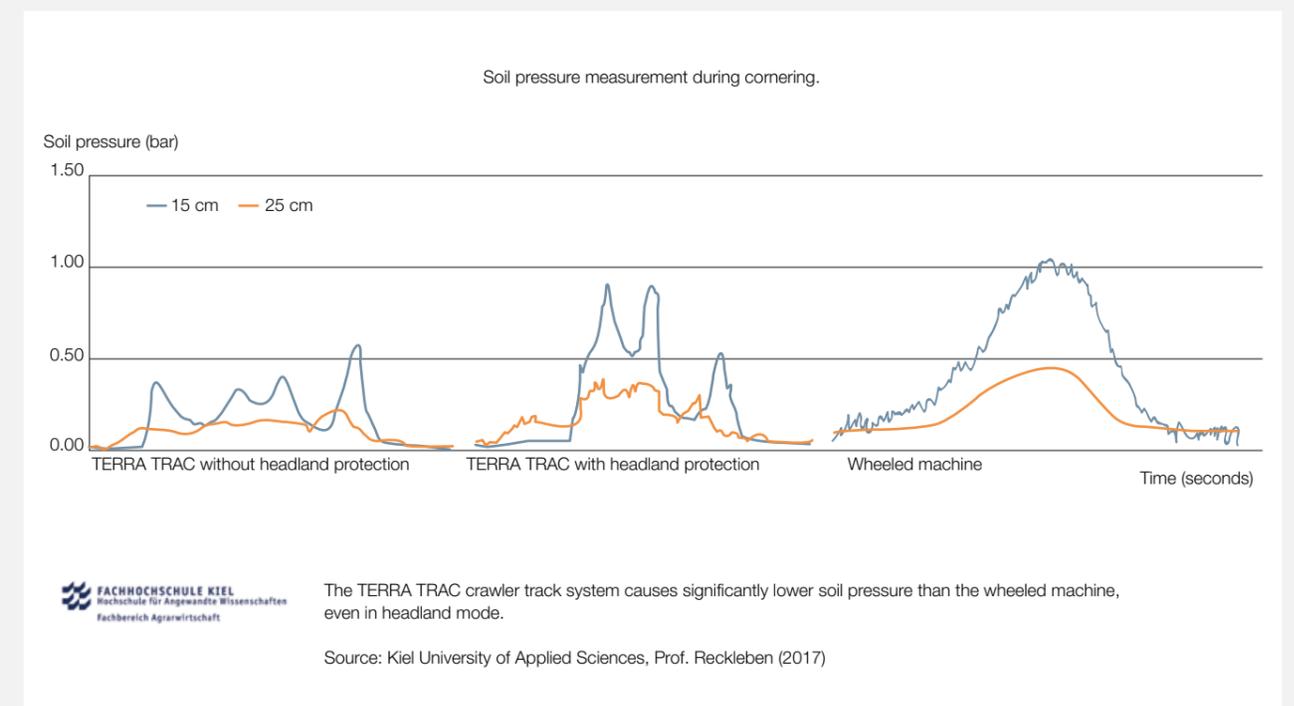
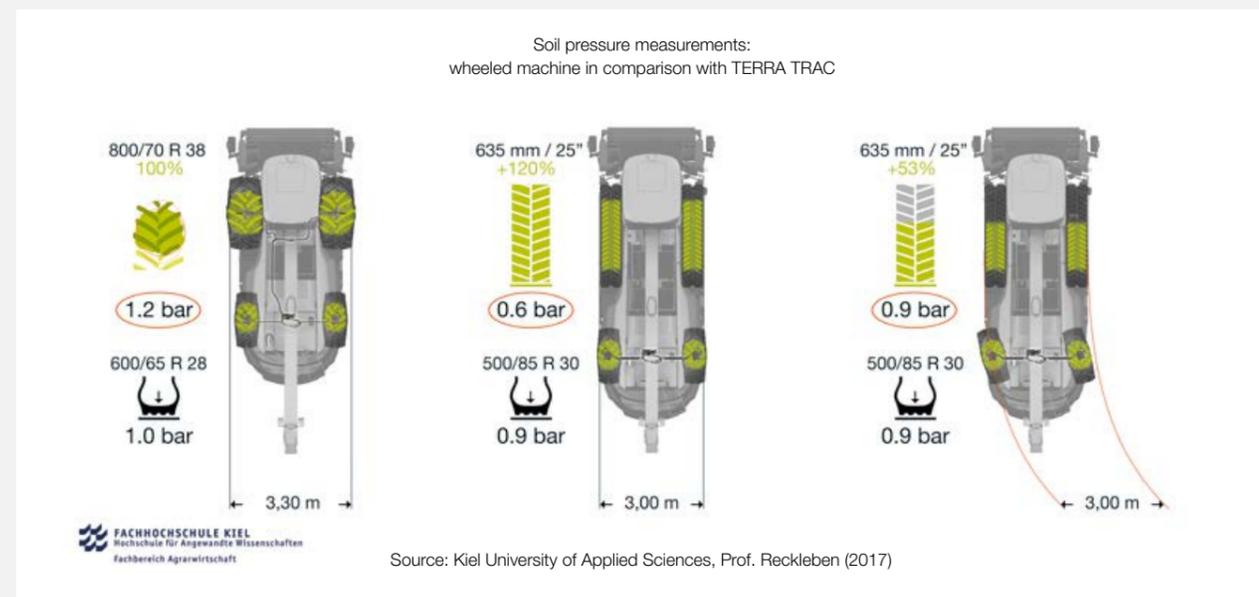
Compaction studies were also carried out at the headland. It was suspected that the soil pressure of the crawler track machine in headland mode would increase because of the shortening of the contact area. However, even with the 635 mm wide track, the results clearly told a different story: despite the active headland mode, the soil pressure load figures were approximately the same as those for a wheeled machine.

Soil compaction was not the only effect that was analysed. Damage to the grass cover and subsequent crop growth were also investigated. This involved conducting assessments of the growth height, rut depth and damage to the grass cover. The result: the figures attained by the JAGUAR TERRA TRAC with headland protection when turning with a reduced track contact area and narrower rear tyres practically matched those of the wheeled machine and confirmed that it protected the grass cover.

Headland protection, along with the many other advantages of the drive concept, such as soil protection, increased traction and a transport width of less than 3.0 m (635 mm tracks), proved itself in the study and demonstrated improved overall performance compared with conventional wheeled machines.



Measurement of soil pressure during cornering with headland protection



TERRA TRAC on AXION.

The AXION 900 TERRA TRAC from CLAAS is the first half-track tractor with full suspension. Its key innovation is the inclusion of the suspended TERRA TRAC crawler track system. This is based on the technology currently in use with combine harvesters but has been specially adapted to meet the requirements of tractors. Currently still at the prototype stage, the AXION 900 TERRA TRAC will, in the near future, combine the advantages of a tracklaying tractor in terms of traction and soil protection, with the more convenient drive characteristics of a conventional standard tractor. Thanks to its individually suspended rollers, the crawler track system permanently guarantees optimum ground contact and a maximum contact area, making the AXION 900 TERRA TRAC comfortable and efficient on the road and in the field, even when travelling at high speeds of up to 40 km/h.

How you benefit:

- Very high tractive power and fuel efficiency through high traction and minimal slippage, even during heavy tillage at low speed
- Soil protection: large contact area prevents tractor from sinking into ground and soil compaction
- Operating reliability: high mobility, even under difficult conditions through ability to negotiate surfaces with reduced load-bearing capability
- High driving comfort at up to 40 km/h through intelligent suspension of crawler track system
- Flexibility through more compact dimensions than the version with wide or twin tyres



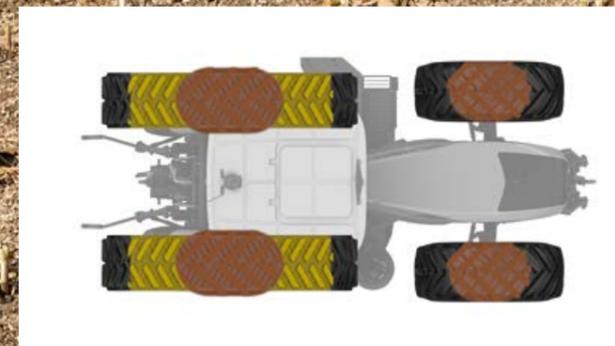
Prizewinner:
DLG Silver Medal at
Agritechnica 2017



The large drive wheel allows high torque transmission.



Despite its large contact area, the AXION 900 TERRA TRAC is narrower than the version with wide or twin tyres.



Thanks to the large contact area, the AXION 900 TERRA TRAC can transmit its pulling power to the ground efficiently with maximum traction.



The independent suspension of the drive wheel, land wheel and support rollers allows the crawler track unit to adapt optimally to the ground surface.

Already convinced.

▶ You can find further information at terratrak.claas.com

William and Harry Barton,
Nottinghamshire, England



Farmed area: 1,415 ha
Soils: medium to heavy clay loams
Arable: winter wheat 425 ha, winter barley 283 ha, rapeseed 283 ha, field beans / spring field beans 212 ha, spring barley 105 ha, spring wheat 107 ha
Staff: William and Harry Barton, three full-time employees, two casual workers at harvest
Combine harvester currently used: LEXION 780 TERRA TRAC

"We'd had a few wet harvests and seen the damage that could be done by the combine harvester with the large cutterbar. We were certain that crawler tracks were the answer – and we were absolutely right. It rained a lot this season and our TERRA TRAC machine was the only combine harvester in the area that could operate in the fields. The crawler tracks have proved their worth in just one year. We're completely sold on this solution. Our aim is to keep the soil in the best possible condition. That's why we've now chosen to go for controlled traffic. But the advantages of the crawler tracks don't end there: the combine harvester doesn't have to slow down to turn at the headland because the directional stability is significantly higher with crawler tracks."

Alexander Klümper,
Bias, Germany



Farmed area: 760 ha
Arable: barley, maize, peas averaging 95 ha each per year, rapeseed 190 ha, wheat 275 ha
Soils: sandy to sandy loams
Staff: Alexander Klümper, two full-time employees, three casual workers at harvest
Combine harvester currently used: LEXION 770 TERRA TRAC

"Soil protection has always been a very important issue for us on our farm. So it was just logical to choose the combine harvester with TERRA TRAC. Especially now that controlled traffic and direct drilling mean that it's practically essential. A machine of this size with tyres would simply have exerted too much pressure or would have been much too wide, which wouldn't have been manageable in view of the long distances between our farm and the fields. The crawler tracks also make for outstanding cutterbar guidance, in fact it's a must when you're dealing with 12 metres. Whatever the speed, the combine harvester runs completely smoothly, even peas can be threshed really fast."

David and Finlay Hay,
Perthshire, Scotland



Farmed area: 2,630 ha
Arable: winter wheat 880 ha, rapeseed 280 ha, winter barley 170 ha, spring oats 330 ha, spring barley 100 ha, turnips 45 ha, potatoes 280 ha, peas 320 ha, remaining area grassland and ecological priority area
Soils: heavy loams, light sandy soils
Staff: David and Finlay Hay, two permanent employees, five casual workers
Combine harvester currently used: LEXION 780 TERRA TRAC

"With the TERRA TRAC crawler units, we leave a much lighter footprint behind us and can work easily on slopes where we used to have difficulties with traction. Another big advantage is the compact transport width on the road. That's an important factor for us as we cover 25 farms across a 29 km area."

Robert and Ed Salmon,
Norfolk, England



Farmed area: 1,964 ha
Arable: winter wheat 649 ha, winter barley 209 ha, spring barley 99 ha, spring beans 270 ha, grass seed 46 ha, linseed 153 ha, rapeseed 361 ha, silage maize 42 ha, forage rye 9 ha, malting rye 39 ha, sugar beet 30 ha, potatoes and onions 58 ha
Soils: predominantly clay loams, some lighter sandy soils
Staff: Robert and Ed Salmon, four employees, other casual workers at harvest
Combine harvester currently used: LEXION 780 TERRA TRAC

"Maintaining a good soil structure is our key focus here and the expense of having tracks was easily justified by our ability to travel in less than ideal conditions without doing damage. Having 900 mm wide tyres just wouldn't work with our narrow lanes. The other unexpected improvement that came with the tracks was how they helped in increasing work rates. Because they provide such a stable platform for the front attachment, you can run faster in the field. And when you cross a tram line, you don't even notice that it's there."

Our partners.

GRIMME



The MAXTRON 620 6-row, self-propelled beet harvester

About the company:

The GRIMME group is an international agricultural machinery group which has its headquarters in Damme in Lower Saxony, Germany. Over 2,200 employees work at five production sites and in twelve international sales and service companies. The group is run today by Franz Grimme, who is the fourth

generation of the family. His son Christoph has been a member of the management team of GRIMME Landmaschinenfabrik since 2016. The company's potato, beet and vegetable technology is distributed through specialised dealers in 120 countries. GRIMME is the world market leader in potato technology.



Christoph Grimme,
Head of International Production

"From the very start we chose to rely on the crawler track units from CLAAS for our self-propelled potato and beet harvesters. The large contact area provides a very high degree of soil protection and lateral stability

on slopes. The excellent running characteristics, both in the field and on the road, were another important factor. A great advantage is the compact installation space which allows a shallow incline for the webs of the potato and beet harvesters. Steep inclines, which can damage the crop, are avoided. We have worked exclusively with CLAAS crawler track units since 1998 and value the spirit of partnership which characterises our cooperation."

PLOEGER OXBO GROUP



The EPD 540 self-propelled pea harvester

About the company:

With a workforce of some 700, Ploeger Oxbo Group develops and manufactures self-propelled machines for specialised markets in the agricultural sector. The products include harvesting equipment for peas, beans and spinach as well as

potatoes, grapes and berries. The product range has recently been extended with the addition of a self-propelled slurry spreader.



Niels Havermans,
Director, Sales and Marketing

"The PLOEGER EPD 540 is a pea harvester which was developed for the plucking and hulling of green, soft peas in the field. As the vegetable harvest runs 24 hours a day for some 8 weeks, even under difficult conditions, the machines have to be extremely reliable and durable and require a robust drive. Since adopting the TERRA TRAC in 2009, we have found it to be excellent on all these counts. In contrast to tyres, the suspension and wide tracks deliver outstanding performance with regard to comfort and the ability to negotiate difficult field conditions."

the machines have to be extremely reliable and durable and require a robust drive. Since adopting the TERRA TRAC in 2009, we have found it to be excellent on all these counts. In contrast to tyres, the suspension and wide tracks deliver outstanding performance with regard to comfort and the ability to negotiate difficult field conditions."

Dewulf



The 4-row, self-propelled Kwarto sieving harvester

About the company:

Dewulf is the world's leading full-range supplier of potato and carrot processing machines. With over 290 employees at three sites in Belgium, the Netherlands and Romania, Dewulf is the industry leader in the development and production of

agricultural machines for tillage as well as planting, harvesting, grading, storing and transporting potatoes and vegetables. A family business with a rich history, Dewulf is currently being run by the third generation of the family.



Willem Decramer,
Commercial Manager

"We use the CLAAS TERRA TRAC crawler tracks on our 4-row, self-propelled Kwarto sieving harvester. The 900 mm wide crawler track units make for an absolutely flat soil surface after harvesting with minimal soil compaction. Thanks to the TERRA TRAC units, the Kwarto is the harvester that causes the lowest soil compaction per cm² on the market – without overloading the rear wheels and without narrow front wheels that dig in deep between the rows. This means that we can guarantee a very successful harvest season, even in very damp soil conditions."

the machines have to be extremely reliable and durable and require a robust drive. Since adopting the TERRA TRAC in 2009, we have found it to be excellent on all these counts. In contrast to tyres, the suspension and wide tracks deliver outstanding performance with regard to comfort and the ability to negotiate difficult field conditions."

Looking ahead: HAWE and CLAAS cooperation project



HAWE field transfer trailers with driven TERRA TRAC crawler tracks



Lutz Mahnig, Export
Sales Manager at
HAWE-Wester GmbH
& Co. KG and Hendrik
Schulze Zumkley,
Project Manager at
CLAAS
Industrietechnik
GmbH



CLAAS is working in cooperation with field transfer trailer manufacturer HAWE to develop a driven TERRA TRAC crawler track unit for towed equipment. A prototype is currently undergoing validation and being subjected to various tests. The maximum input power is 162 kW (220 hp) and road travel at 40 km/h is possible. The first results are highly promising and indicate a doubling of the tractive power of the tractor/trailer combination under certain parameters. This means that the entire combination has significantly increased traction for which there is a particular requirement in wet and hilly terrain. At the same time, the soil is protected throughout the entire process chain.

CLAAS KGaA mbH
Mühlenwinkel 1
33428 Harsewinkel
Deutschland

Tel. +49 5247 12-0

claas.com

Ensuring a better **harvest.**

